



FERTILIZERS for Field Crops 1956

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The Fertilizer Situation

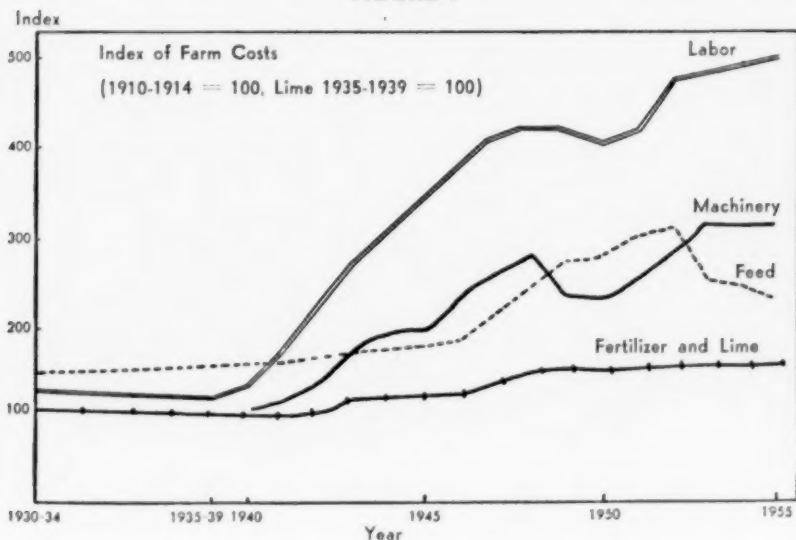
The United States Department of Agriculture predicts an ample supply of plant nutrients for 1956. Prices are about the same as last year, but some sources of nitrogen will be lower in price. The trend

continues toward the use of fertilizers of higher analyses, with the greater proportion as granulated material. Some of the newer straight nitrogen materials, such as anhydrous ammonia, nitrogen solutions, and urea, will be more widely available than in previous years.

Fertilizer Bargains

Fertilizer and lime are still the biggest bargains on the farm. Of all the commodities used — fertilizer, seed, feed, machinery, and the like — the cost of fertilizer has increased the least (figure 1).

FIGURE 1



Potassium

As the yield per acre of crops is increased by the use of nitrogen and phosphorus and lime, the need for potassium also increases. Then, too, the substitution of crops with higher potassium requirements, such as alfalfa, has increased the need for applied potassium.

Soils differ considerably in their power to supply potassium. Sands and gravels are naturally lower in potassium than the heavier-textured loams, silt loams, and clay loams; however, wide differences in supplying power do exist between soils of the same texture. Also, heavy applications of manure, past and present, build a temporary supply in the soil. Therefore, it is good practice to test for potassium in soils where the status is in doubt.

Secondary or Minor Elements

Most New York soils supply enough boron, magnesium, manganese, copper, sulfur, iron, zinc, and molybdenum for field crops.

Boron deficiency is often found on alfalfa during drouths. The characteristic yellowing of the tops of alfalfa plants can be prevented by a topdressing of 25 pounds of borax an acre, but economically significant yield increases have not been obtained in New York because moisture limited growth more than did the deficiency of boron.

Magnesium as shown by soil tests has been very low on many acid soils; often as low as 5 to 10 pounds per acre. Experimental applications of magnesium on such soils have not given profitable increases of field

crops. None of the high-lime soils has been found to be low in magnesium.

Fall Application of Nitrogen

● **For plow under?** Most of the articles in magazines on plowing under nitrogen in the fall were written for western corn-belt farms where the danger of leaching is less than in New York. The kinds of nitrogen least likely to leach under New York conditions are anhydrous ammonia, urea, cyanamide, and nitrogen solutions. Fall application for plowing under is not encouraged in New York.

Extra nitrogen for row crops is more efficiently used when applied in the spring shortly before plowing, at plowing time, or as a side-dressing.

● **Topdressing grass?** A good sod of timothy or other grass picks up nitrogen applied in late September or October and reduces or prevents over-winter leaching. Probably a fall application on low-nitrogen sods is somewhat less efficient than an early spring application, but a fall application has the advantages of (1) convenience of time of application and (2) the assurance that it will be on the field rather than in the bag in a wet spring.

Superphosphate with Manure

The use of superphosphate in the stable:

- Balances the nutrients
- Asorbs and holds nitrogen
- Absorbs moisture and reduces slipperiness

(continued on the center spread)



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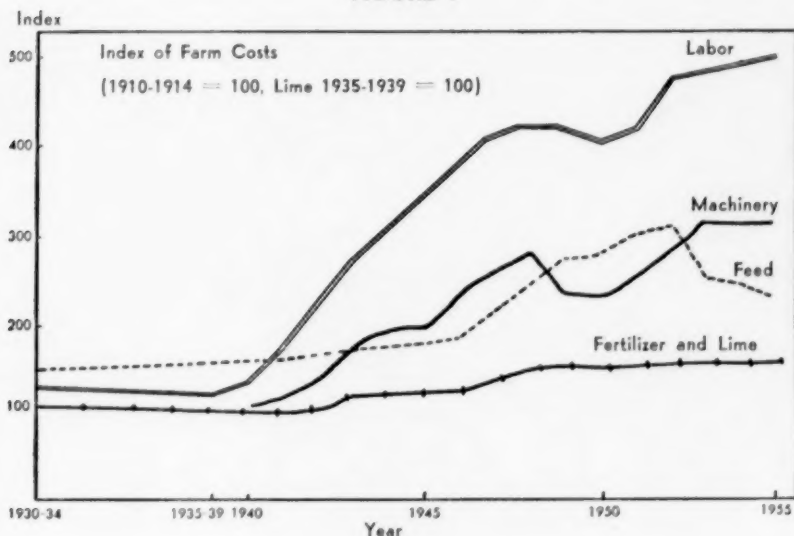
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FIGURE 1



Manure is low in phosphorus, and the addition of superphosphate makes it a better balanced fertilizer.

Superphosphate applied with the manure is held in more available form than if applied directly to the soil.

Where the phosphorus level of the soil has been maintained by mod-

erate fertilization, 1 pound of superphosphate in the stable per cow per day is enough.

Soil Testing

Complete soil tests for pH, total organic matter, and available phosphorus, potassium, and magnesium are available through local county agricultural agents and some local

fertilizer dealers. They have containers and instructions for taking the samples. The county agent sends the samples to the Soil Testing Laboratory of the Department of Agronomy at Cornell. He also makes recommendations for fertilizer use and soil management after receiving the results of the tests from the laboratory.

FERTILIZERS FOR FIELD CROPS, 1956

Ratio: Refers to the balance or relative amount of nitrogen (N) to phosphorus (P_2O_5) to potassium (K_2O) in a mixed fertilizer. A 1-1-1 ratio has the same relative amounts of these three plant foods, but a 1-2-1 ratio has twice as much phosphorus as either nitrogen or potash.

Analysis or Grade: Refers to the actual guaranteed composition of the fertilizer. A 1-1-1 ratio may therefore be available in several grades, such as 12-12-12, 10-10-10, or 7-7-7. Likewise a 1-2-2 ratio may be purchased as 5-10-10 or 8-16-16.

The high-analysis grades are usually the better buy since savings are made in the transportation and handling of the more concentrated materials. They cost more per ton but less per pound of nutrients.

Amount: Apply fertilizer according to the total recommended amounts of nutrients. Thus 35-70-70 pounds of $N-P_2O_5-K_2O$ can be applied as either 440 pounds of 8-16-16 or 700 pounds of 5-10-10.

Composition of Un-mixed Fertilizer Materials:

Nitrogen		Phosphorus	
Ammonium Nitrate	33.5% N	Superphosphate	18-20% P_2O_5
Ammonium Sulfate	20.5% N	Triple-Superphosphate	45% P_2O_5
Ammonium Nitrate Lime-stone (ANL)	20.5% N		
Calcium Cyanamid	21% N		
Sodium Nitrate	16% N		
Urea	40-46% N		
Nitrogen Solution 2	41% N	Potash	
Anhydrous Ammonia	82% N	Muriate of Potash	60% K_2O

The high-analysis grades are listed for each crop in the large table but equivalent amounts of the lower analysis grades of the same ratio can be determined from the small table below.

Ratio $N-P_2O_5-K_2O$	Grades		If alternate is used, multiply amount in table by:
	First Choice $N-P_2O_5-K_2O$	Alternate	
1-1-1	10-10-10, 12-12-12, 13-13-13	7-7-7	1.4
1-2-1	8-16-8, 10-20-10, 12-24-12	6-12-6 or 5-10-5	1.3 1.6
1-2-2	8-16-16 or 10-20-20	5-10-10	1.6
0-1-1	0-20-20	0-14-14	1.4
0-1-2	0-15-30	0-12-24	1.2

Consult Your Local Dealer for the "Best Buy" Grade Available.

Fertilize the Rotation: These fertilizer recommendations are given for each individual crop. The fertility program for a field can best be planned on the basis of the whole rotation, because a large amount of fertilizer applied to one crop influences the kind and amount that is needed for the crops that follow.

Phosphated Manure: Some farmers use 2 pounds of superphosphate on the stable floor per cow each day. Soil tests show that farmers who have followed this practice for many years, together with liberal fertilization at planting time, have accumulated a high phosphorus reserve in some fields. It is more economical for these farmers to shift to 1 pound of superphosphate.

Crop	Situation	Recommended Nutrients		Suggested Analysis and Application	Special Suggestions
		Ratio	Lbs. per acre		
		$N-P_2O_5-K_2O$	$N-P_2O_5-K_2O$	Amount per acre	
1. CORN	Manure or a good legume sod, plowed down	1-1-1	20-20-20	10 T. phosphated manure plus 200 lbs. 10-10-10	Fertilize in the row at planting time.
	No manure, no legume sod	1-1-1 and 1-0-0	40-40-40 plus 30-0-0	400 lbs. 10-10-10 and 30 lbs. of actual nitrogen	Row fertilize at planting time. There may be danger of fertilizer "burn" at this or higher rates if the fertilizer is placed in contact with seed. Top-dress grass sod before plowing or side-dress corn when 12 to 18 inches tall. Side-dressing most needed if heavy rains after planting leach the nitrogen.
		or 1-2-2 and 1-0-0	20-40-40 plus 50-0-0	250 lbs. 8-16-16 plus 50 lbs. actual nitrogen	
		1-2-1	35-70-35	440 lbs. 8-16-8	
2. OATS or BARLEY seeded to a forage mixture	Not likely to lodge (medium to low nitrogen): High potash soils*	1-2-1	20-40-20	250 lbs. 8-16-8	Garry, Mohawk, Clinton, Craig oats or Moore barley
		1-2-2	35-70-70	440 lbs. 8-16-16	Ajax and other weak-strawed varieties
	Likely to lodge (high nitrogen): High potash soils* Medium to low potash soils*	1-2-2	20-40-40	250 lbs. 8-16-16	Garry, Mohawk, Clinton, Craig oats or Moore barley
		0-1-0	0-60-0	300 lbs. of 20% or 150 lbs. 45% superphosphate	Ajax and other weak-strawed varieties
		0-1-1	0-60-60	300 lbs. 0-20-20	Lodging is still a problem on some heavily manured fields (especially valley farms). Except for these situations, farmers are generally urged to use nitrogen on the stiff-strawed varieties.
		1-1-1	35-35-35	350 lbs. 10-10-10	Garry, Mohawk, Clinton, Craig oats or Moore barley
3. OATS or BARLEY not seeded		1-1-1	20-20-20	200 lbs. 10-10-10	Ajax and other weak-strawed varieties
4. WHEAT or WINTER BARLEY or RYE		1-2-1 and 1-0-0	20-40-20 plus 30-0-0	250 lbs. 8-16-8 and 30 lbs. Actual nitrogen	At planting time. Top-dress in spring. Apply phosphated manure if seeded.
					Fertilize forage seeding in following years as outlined under Crop 9.

Top-dress seedings in following years as outlined under Crop 9.

Omit fertilizer if grain is likely to lodge.

Fertilize forage seeding in following years as outlined under Crop 9 if seeded.

WINTER BARLEY or RYE		and 1-0-0	plus 30-0-0	30 lbs. Actual nitrogen	Top-dress in spring. Apply phosphated manure if seeded.	ing in following years as outlined under Crop 9 if seeded.
5. SUDAN GRASS Seeded to a forage mixture	Manured	1-1-1	20-20-20	8 T. phosphated ma- nure plus 200 lbs. 10-10-10	Top-dress seeding later. See Crop 9.	
	Not manured	1-2-1	30-60-30	375 lbs. 8-16-8	Use 1-2-2 ratio on low potash soils. Top-dress seeding later. See Crop 9.	
		1-2-2	30-60-60	375 lbs. 8-16-16		
6. SUDAN or MILLET (not seeded)		1-1-1	40-40-40	400 lbs. 10-10-10		
7. ALFALFA No companion crop	High potash soils*	0-1-0	0-60-0	300 lbs. 20% or 150 lbs. 45% super- phosphate	Apply at planting time.	
	Low potash soils*	0-1-1	0-60-60	300 lbs. 0-20-20	Top-dress seeding later. See Crop 9.	
	Generally low fertility	1-2-2	30-60-60	375 lbs. 8-16-16	Band-seeding may have particular application here to improve establishment.	
8. BIRDSFOOT TREFOIL seeded without a companion crop	Soils low in nitrogen (old grass sods)	1-2-1	30-60-30	375 lbs. 8-16-8	For medium to high potash soils.	
		1-2-2	30-60-60	375 lbs. 8-16-16	For low potash soils.	
	Soils with medium to high nitrogen	0-1-1	0-60-60	300 lbs. 0-20-20	For soils low in potash not receiving manure.	
		0-1-0	0-60-0	300 lbs. 20% or 150 lbs. 45% super- phosphate	For soils with no indication of high potash requirement.	
9. TOPDRESSING ALFALFA or LADINO CLOVER or BIRDSFOOT TREFOIL	Manured			6 T. phosphated ma- nure	Apply manure every other year. Use 0-1-0, 0-1-2, or 0-1-1 ratio fertilizer the alternate year depending on soil test. See next lower sections.	
	Not manured: Low potash soils*	0-1-2	0-30-60	200 lbs. 0-15-30	Best on very low potash soils where soil phosphorus is medium to high.	For best efficiency, apply after first cutting of hay, or after flush of spring grazing.
		0-1-1	0-60-60	300 lbs. 0-20-20	For soils low in both phosphorus and potash or where very large yields are removed. May be alternated with manure or 0-1-2.	
		0-1-1	0-40-40	200 lbs. 0-20-20	Where some potash is needed on loams and slightly heavier soils.	
		0-1-0	0-100-0	500 lbs. 20% or 225 lbs. 45% super- phosphate	For soils that have a high potash supplying power (clays, heavy loams) or where unphosphated manure is used. Repeat after 3 years.	
10. TOPDRESSING TIMOTHY BROMEGRASS ORCHARDGRASS		1-1-1	50-50-50	6 T. manure or 500 lbs. 10-10-10	Apply manure or 10-10-10 every other year and straight nitrogen fertilizer in the year between. On heavy soils, nitrogen alone may be sufficient. Apply fertilizer in early spring.	
		1-0-0	50-0-0	50 lbs. of Actual nitrogen	For extra summer pasture apply 50 pounds of nitrogen in June, July, and August if rainfall is adequate for the grass to use each addition. Orchard-grass makes best use of extra nitrogen.	
11. NATIVE PASTURE	Without legumes	1-1-1	40-40-40	400 lbs. 10-10-10	6 tons phosphated manure may be substituted and spread 2 months before spring grazing.	
	With legumes	0-1-1	0-40-40	200 lbs. 0-20-20	Apply after flush of spring growth on light textured soils.	
		0-1-0	0-100-0	500 lbs. 20% or 225 lbs. 45% super- phosphate	Use where potash is not a problem on heavy loams and clays.	
12. BUCKWHEAT		1-2-1	16-32-16	200 lbs. 8-16-8		
13. SOYBEANS		1-2-2	16-32-32	200 lbs. 8-16-16	Do not place fertilizer in contact with seed.	

* Three useful guides to the potash status of a field are:

1. A soil test is a valuable guide on very low or very high potash soils. Check with your county agricultural agent.
2. Heavy applications of manure or high potash fertilizers build a temporary potash reserve.
3. Sands and gravels are naturally lower in potash than heavier textured loams, silt loams, and clay loams. There are, however, differences in soils of the same surface texture in the rate at which they supply potash.



A publication of the New York State College of Agriculture, a unit of the State University of New York, at Cornell University

Cooperative Extension Service, New York State College of Agriculture at Cornell University and the U. S. Department of Agriculture cooperating. In furtherance of Acts of Congress May 8, June 30, 1914. M. C. Bond, Director of Extension, Ithaca, New York.